Answer on Question #46600 - Chemistry – Inorganic Chemistry

Question

From the following titration, calculate molarity of the NaOH solution. Balance equation.

 NaOH + HCl → NaCl + H2O
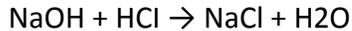
 32.00 ml of NaOH is required to completely react with 25.00 ml of 0.150 M HCl

Answer:

Balanced equation is:

NaOH + HCl = NaCl + H2O
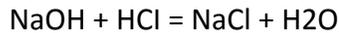
Number of moles of HCl in 25.00 ml of 0.150 M HCl solution is:

$$n = CV$$

C – Concentration of the solution, C = 0.150 M.

V – Volume of the solution, V = 25.00 mL = 0.02500 L.

$$n\,(HCl) = 0.150 \cdot 0.02500 = 0.00375\ mol$$

According to the reaction equation, 1 mol of NaOH completely reacts with 1 mol of HCl, therefore 0.00375 mol of NaOH are needed to completely react with 0.00375 mol of HCl. Then we should calculate what concentration should be the NaOH solution so that 32.00 ml of this solution contain 0.00375 mol of NaOH.

Molarity (molar concentration) of NaOH solution is:

$$C(NaOH) = \frac{n(NaOH)}{V(NaOH)} = \frac{0.00375\ \text{mol}}{0.03200\ L} = 0.117\ M$$

Answer: 0.117 M